

as originally filed. In light of the above amendments, withdrawal of the objections to the drawings is respectfully requested.

In paragraph 4, the Office Action objected to the title of the invention as not being descriptive, and required a new title. The title of the invention has been amended to overcome this objection.

In paragraphs 5 and 6, claims 2, 5, and 10 were rejected under 35 U.S.C. §112, second paragraph as being indefinite. With respect to claims 2 and 10, the Office Action asserted that the limitation "the increment variable" in claims 1 and 7 lacked antecedent basis. The Office Action suggested overcoming this rejection by changing "the increment variable" to "the selected scheduling variable." Applicants respectfully traverse this rejection. First, with respect to the lack of antecedent basis for the limitation "the increment variable" in claims 2 and 10, this element is first introduced with the indefinite article "an" in line 2 of each claim. As such, there is literal antecedent basis for "the increment variable" recited at lines 5 and 4, respectively, in each of claims 2 and 10. Second, as described in Applicants' specification at page 20 through page 22 first full paragraph, the increment variable corresponds to a different variable than the selected scheduling variable.

With respect to claim 5, the Office Action asserted that claim 5 lacked antecedent basis for the limitation "the pointer variable." Claim 5 has been amended to be dependent upon claim 4 as suggested by the examiner. In light of the above explanation with respect to claims 2 and 10, and the amendment to claim 5, withdrawal of the rejections under 35 U.S.C. §112, second paragraph, is respectfully requested.

In paragraph 8 of the Office Action, claims 1-18 were rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,088,355 to Mills et al. (hereinafter Mills) in view of U.S. Patent No. 5,533,020 to Byrn et al. (hereinafter Byrn). This rejection is respectfully traversed.

The Office Action asserts that Mills teaches a data transmission apparatus for transmitting data from a plurality of data streams over a data channel which includes pointer based ATM segmentation and reassembly. The Office Action concedes that Mills does not teach an ATM scheduler. However, the Office Action asserts that Byrn teaches a priority based ATM cell scheduler for a data transmission apparatus, and that it would have been obvious to one of

ordinary skill in the art to apply the ATM scheduler of Byrn to the apparatus of Mills to provide an apparatus capable of improved priority-based ATM cell transmission.

1. The Rejection of Claims 1-18 Over the Combination of Mills and Byrn is Improper

Preliminarily, the Office Action provides no basis for the assertion that one of ordinary skill in the art would have been motivated to combine the teachings of Mills and Byrn to provide “an apparatus capable of improved priority-based ATM cell transmission.” Specifically, both Mills and Byrn disclose that they are capable of being used to provide a particular quality of service with respect to ATM cell transmission (Mills, col. 6, lines 15-39 and Byrn, col. 2, lines 34-63 and col. 2, line 66- col. 3, line 34). Mills does not indicate that its ATM cell transmission is in any way deficient, nor does Byrn indicate that its ATM cell transmission is an improvement over that disclosed in Mills.

More significantly, even if the ATM scheduler of Bryn were capable of providing “improved priority-based ATM cell transmission” as asserted, there is no basis for the assertion that one of ordinary skill in the art would be motivated apply the teaching of Byrn to the ATM segmentation and reassembly (SAR) engine of Mills in order to improve priority-based ATM cell transmission. Specifically, Mills is primarily directed to set top box-type processing (STB) systems in which requirements relating to the transmission of data differ significantly from those relating to the receipt of data. In STB systems, data transmitted from the STB is typically transmitted at a lower data rate than the rate at which data is received (see Applicants’ specification at page 2, second full paragraph). Furthermore, one of the stated objectives of Mills is to provide an “improved processing system suitable for use in set top box applications... with improved efficiency and reduced cost and complexity.” (Col. 2, lines 1-6, emphasis added.)

One of ordinary skill in the art would not be motivated to modify the processing system of Mills to “improve priority-based ATM cell transmission” by adding the ATM scheduler of Byrn because 1) the improvement is not necessary (given the significantly lower requirements for data transmission versus data reception; and 2) such an unnecessary improvement increases both the cost and complexity of the STB system. Accordingly, because one of ordinary skill in the art would not have been motivated to combine the ATM scheduler of Byrne with the SAR of

Mills, the combination of Mills and Byrne is improper and the rejection of claims 1-18 over that combination should be withdrawn.

2. The Office Action Fails to Set Forth a Prima Facie Case of Obviousness

Even if one were motivated to combine the teachings of Byrne with those of Mills, either for the asserted reason, or for another reason, the Office Action provides utterly fails to provide any indication of the proposed modifications necessary to obviate Applicants' invention. As noted in the MPEP, in a rejection under 35 U.S.C. §103, the Office Action should identify "the proposed modification of the applied reference(s) necessary to arrive at the claimed subject matter." (MPEP Section 706.02(j), page 700-31, Original Eighth Edition, August, 2001.) In the present case, although the Office Action cites various portions of each reference, the Office Action fails to identify how the ATM scheduler of Byrn would be integrated into the segmentation and reassembly engine of Mills, as each reference uses different data structures to achieve cell transmission. For example, the Office Action provides absolutely no indication of how the queue-based ATM scheduler of Byrn would be implemented within the pointer-based SAR transmitter 407 of Mills. Accordingly because the Office Action fails to indicate how (or where) the SAR of Mills would be modified to include the ATM scheduler of Byrne, the Office Action fails to set forth a prima facie case of obviousness with respect to claims 1-18. Accordingly, it is respectfully requested that the rejection of claims 1-18 over the asserted combination of Mills and Byrn be withdrawn.

3. Claim 1 Patentably Distinguishes Over the Combination of Mills and Byrn

Arguendo, assuming the combination of Mills and Byrn were proper, claim 1 patentably distinguishes over the asserted combination. Claim 1 is directed to a data transmission apparatus for transmitting data from a plurality of data streams over a data channel. The apparatus comprises a data stream control memory for storing a scheduling variable for each data stream, each scheduling variable being indicative of a scheduled transmission timing for that data stream, a clock for maintaining a current timing indication, a data stream selector, and a data transmission unit. The data stream selector, at time intervals, compares the scheduling variables stored in the memory and selects the scheduling variable indicative of the earliest scheduled

transmission timing and, if that scheduled transmission timing is not earlier than the current timing, generates an indication of the data stream corresponding to the selected scheduling variable and increments the selected scheduling variable. The data transmission unit receives the indication of the data stream and transmits an amount of data from that data stream over the data channel.

Claim 1 patentably distinguishes over the combination of Mills and Byrn for a number of reasons. First, although the Office Action asserts that the Memory Management Unit MMU 8 in combination with memory 4 and VCA 7 stores a scheduling variable (e.g., VC transmission requirement corresponding to rate r , and QOS parameters corresponding to priority p) as recited in claim 1, they do not. In fact, the parameters r and p , if stored at all, are stored in the CSU 9, which, as shown in Fig. 1 is distinct from the MMU 8, the memory 4, the VCA 6, and the VC Information Table 7. (See col. 4, lines 33-52). As shown in Fig. 3 and described at col. 5, line 60 – col. 6, line 10, the contents of the VC Information table include a number of different flow control parameters that may be used to determine the Target Transmission Time (TTT) variable, but this “scheduling” variable is not stored therein. Accordingly, because the MMU 8 in combination with memory 4 and VCA 7 of Byrn does not store a “scheduling variable” as recited in claim 1, claim 1 patentably distinguishes thereover.

Second, although the Office Action asserts that Byrne teaches a data stream selector as recited in claim 1, it clearly does not. Byrn works by having n banks each containing m circular queues which it calls timing wheels. Each timing wheel corresponds to a particular priority p and wheel rate r , as described at column 4, lines 33- 40, and the ID of each queue (i.e., VC) is put in a wheel. Although the parameters p and r for a given queue are indicative of a target transmission time TTT, these parameters are not used in the manner recited in claim 1. Specifically, as described at column 5, lines 23-59 and column 6, lines 21-65 with respect to Fig. 2B, the selector 51 of the CSU9 selects all the wheels that have cells scheduled for transmission at a current time. It then proceeds to select the wheel with either the highest priority p or the highest wheel rate r so that the ID of VC stored at the current wheel position can be sent to the memory management unit in order for data from that VC to be transmitted.

It should be appreciated that the system of Byrn does not determine whether the scheduled timing of any of the selected wheels “is not earlier than the current timing” as recited

in claim 1, because Byrn purposely selects wheels that have cells scheduled for transmission after a current time. Specifically, “a target transmission time is evaluated for each queue, and signals are generated for each target transmission time at a time at least after each target transmission time is reached.” (Col. 3, lines 16-29, emphasis added; see also col. 6, lines 52-65.)

Further, although the parameters p and r are looked at in order to select one of the wheels that have cells scheduled for transmission at the current time, there is no disclosure in Byrn of incrementing these parameters. The only parameter that is in fact updated is the credit count, described at column 6, lines 57-59, which refers to the number of cells that may be transmitted in a given time interval. There is no disclosure of incrementing either the parameter p or the parameter r or indeed the scheduled transmission time variable TTT.

Additionally, it should be appreciated that the system of Byrn is based around the transmission of individual cells, and the scheduled transmission time, the wheel rate r, and the priority p are for each cell, as described at column 4, lines 53-56. This is in contrast to Applicants' invention as recited in claim 1, in which the scheduling variable corresponds to the scheduled transmission timing of a data stream, and not to an individual cell of a data stream.

In summary, because Byrn fails to disclose, teach, or suggest any of the limitations of the data stream selector recited in claim 1, and these limitations are not disclosed, taught or suggested by Mills, claim 1 patentably distinguishes over the combination of Mills and Byrn. According, the rejection of claim 1 under 35 U.S.C. §103(a) over the combination of Mills and Byrn should be withdrawn.

Claims 2-18 depend either directly or indirectly from claim 1 and patentably distinguish over the combination of Mills and Byrn for at least the same reasons.

CONCLUSION

In view of the foregoing amendments and remarks, this application should now be in condition for allowance. A notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee

occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to deposit account No. 23/2825.

Respectfully submitted,

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Attorney's Docket No.: S01022.80338

Dated: January 14, 2003

Serial No. 09/413,644

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Art Unit: 2665

MARKED-UP SPECIFICATION

The title of the invention has been amended as follows:

DATA [TRANSFER] TRANSMISSION APPARATUS FOR TRANSMITTING ATM DATA
STREAMS.



MARKED-UP CLAIMS

The claims have been amended as follows:

5. (Amended) Data transmission apparatus as claimed in claim [3] 4, wherein on selecting a data stream the data stream selector increments the pointer variable for that data stream.

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